Installation and Operating Instructions No. 91527.002

# Roof fan DV EC... Pro

## with EC-technology

## For Central Ventilation System ZLS

**For the connection and configuration, as well as the operation of the operator terminal BDT or the software, please refer to ZLS-DVEC Quick Overview (No. 92870) for advice.**

# 1. Foreword

**This manual contains instructions and information required for the safe and optimal installation of the roof fan DV EC... Pro.**

**This manual applies for the following types:**

| | |
|---|---|
| **DV EC 200 Pro** | **(Ref.No. 8385)** |
| **DV EC 250 Pro** | **(Ref.No. 8386)** |
| **DV EC 400 A Pro** | **(Ref.No. 8387)** |
| **DV EC 400 B Pro** | **(Ref.No. 8389)** |

**Read this manual carefully before commencing installation or maintenance of the fan.**

It is also intended as a reference work for operation and maintenance, so that this can be carried out in a sound manner. As a supplement the ELS-DVEC quick overview can be pulled up. This installation and operating instructions have been compiled with the greatest diligence by Helios. However, no rights may be derived from this publication. Helios also retains all rights to change the contents of this document without prior notification.

*Helios wishes you a lot of enjoyment in your DV EC..Pro roof fan.*

# 2. Warrenty and liability

**2.1 General**
The general sales conditions of Helios Ventilatoren apply to the DV EC..Pro roof fan.

**2.2 Warranty claims - Exclusion of liability**
If the preceding instructions are not observed all warranty claims and accommodation treatments are excluded. This also applies to any liability claims extended to the manufacturer.

**The warrenty will be cancelled if:**
- installation has not been carried out to the applicable regulation;
- the defects are due to incorrect connections,
- inexpert use or soiling of the fan;
- and repairs have been made without permission from the supplier.

On-side disassembly and assembly costs are not covered by the terms of the warrenty. If a defect occurs during the warranty period, please notify the installer.

**2.3 Liability**
The DV EC..Pro has been designed for extraction of (polluted) air, which is diagonally exhausted. Any other application is seen as 'inappropriate use' and may result in damage to the device or personal injury, for which the manufacturer cannot be held liable.

☞ Work to be carried out on the fan may only be carried out by a registered/qualified installer

☞ The manufacturer is not responsible for any damage derived from:

- non compliance with the safety, operating and maintenance instructions in this manual;
- the use of components not supplied by the manufacturer;
- normal wear and tear.

! Illustrations and specifications without obligation.
Subject to technical changes.

# 3. Safety / 4. Technical data

**Safety**
It is important that you heed the safety regulations given below, for sensible use of the DV EC..Pro roof fan but also for your own safety and that of other people

### 3.1 General safety regulations

- Always comply with the safety regulations and instructions given in this manual.
- Make sure that the fan and/or parts thereof, not (yet) anchored and tools cannot fall/blow off the roof or cause damage or personal injury in any other manner.
- When the fan is completely or partly dismantled, make sure nobody can touch rotating parts or parts under current.
- Do not leave a (partly) dismantled fan which is connected to the power supply, unattended.
- Make sure that parts which conduct current do not become wet.
- The fan must be fitted in such a manner that there is no risk of anybody touching the side of the fan which does not have a protective screen(see DIN EN ISO 13857).
- When mounting do not allow moisture to enter the control unit. During rain or fog, the controller must be covered!

### 3.2 Pictograms used

The following pictogram may be used in this manual:

☞ Point of attention

### 4.1 General specifications

**Fan characteristics**
The fan characteristics (page 4) indicate the air produced at various speeds.

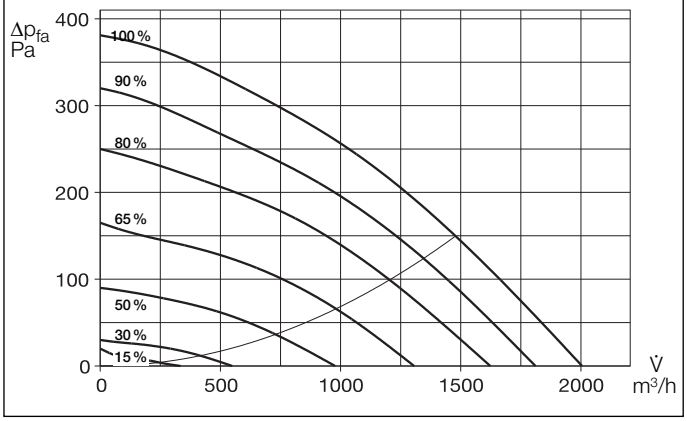
**Delivery side noise**
The noise pressure level in dB(A) is measured on the delivery (=exhaust side) of the fan at a distance of 4 metres, horizontally, under free field conditions, unblocked suction (ref. $2 \cdot 10\text{-}5$ N/m²). As the distance to the source of noise (= fan) increase, the noise will decrease, to the extent that the noise is reduced by approx. 6 dB(A) when the distance is doubled.

**Suction side noise**
The noise production at the suction side is measured at the suction side of the fan (ref. 10-12 W).

## 4.2 Performance data

at standard condition = ρ 1,20 kg/m³ (≙ T=20 °C, $p_a$ = 1013 hPa) = sea level

**DV EC 200 Pro**

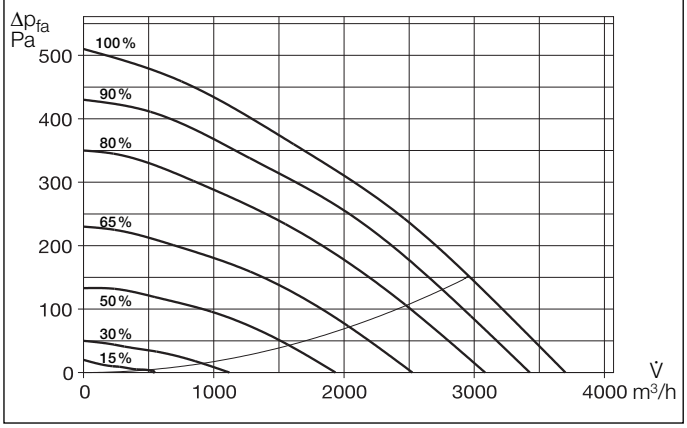



■ **DV EC 200 Pro** – current and noise level, performance related

| Setting / Performance | Current consumption | Power consumption | Noise level Sound pressure level | Sound power level suction side |
|---|---|---|---|---|
| % | A | W | dB(A) in 4 m | dB(A) |
| 100 | 1,38 | 180 | 52 | 70 |
| 90 | 1,15 | 130 | 50 | 68 |
| 80 | 0,90 | 106 | 47 | 66 |
| 65 | 0,57 | 70 | 42 | 62 |
| 50 | 0,31 | 41 | 35 | 55 |
| 30 | 0,13 | 10 | 24 | 44 |
| 15 | 0,09 | 5 | 22 | 42 |

Installation of the DV EC..Pro on a base attenuator reduces the sound power level by approx. 15 dB(A).

**DV EC 250 Pro**

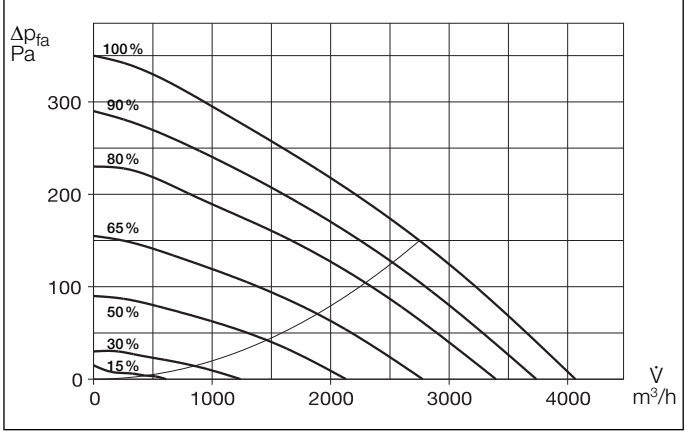



■ **DV EC 250 Pro** – current and noise level, performance related

| Setting / Performance | Current consumption | Power consumption | Noise level Sound pressure level | Sound power level suction side |
|---|---|---|---|---|
| % | A | W | dB(A) in 4 m | dB(A) |
| 100 | 1,78 | 412 | 60 | 75 |
| 90 | 1,54 | 354 | 58 | 73 |
| 80 | 1,14 | 264 | 55 | 70 |
| 65 | 0,67 | 154 | 50 | 66 |
| 50 | 0,36 | 78 | 43 | 61 |
| 30 | 0,16 | 24 | 35 | 49 |
| 15 | 0,10 | 11 | 24 | 43 |

Installation of the DV EC..Pro on a base attenuator reduces the sound power level by approx. 15 dB(A)

**DV EC 400 A Pro**

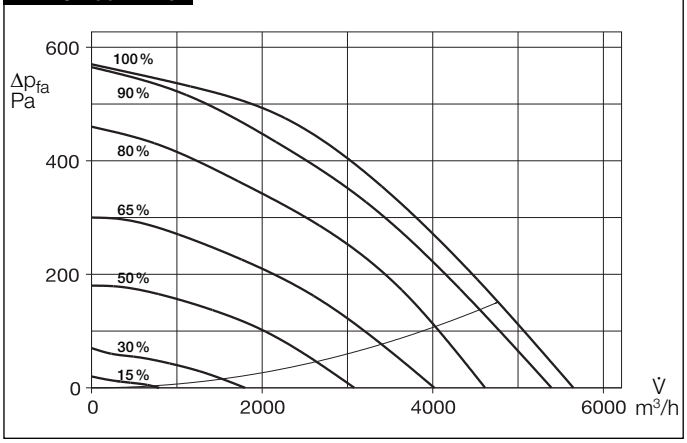



■ **DV EC 400 A Pro** – current and noise level, performance related

| Setting / Performance | Current consumption | Power consumption | Noise level Sound pressure level | Sound power level suction side |
|---|---|---|---|---|
| % | A | W | dB(A) in 4 m | dB(A) |
| 100 | 1,33 | 303 | 51 | 68 |
| 90 | 1,01 | 232 | 49 | 66 |
| 80 | 0,77 | 176 | 46 | 64 |
| 65 | 0,47 | 103 | 41 | 61 |
| 50 | 0,26 | 53 | 34 | 54 |
| 30 | 0,14 | 18 | 25 | 54 |
| 15 | 0,10 | 9 | 22 | 42 |

Installation of the DV EC..Pro on a base attenuator reduces the sound power level by approx. 15 dB(A)

**DV EC 400 B Pro**

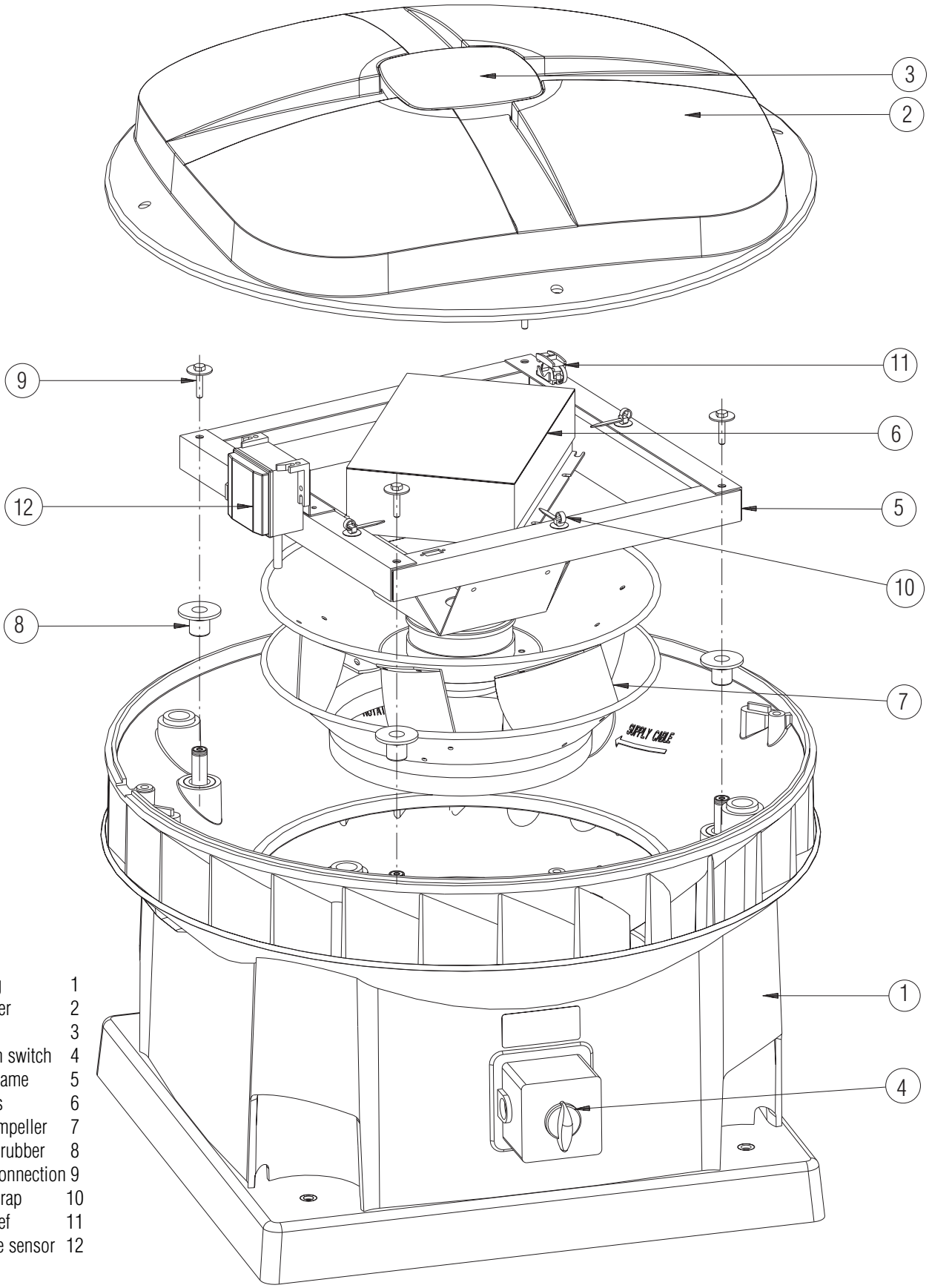



■ **DV EC 400 B Pro** – current and noise level, performance related

| Setting / Performance | Current consumption | Power consumption | Noise level Sound pressure level | Sound power level suction side |
|---|---|---|---|---|
| % | A | W | dB(A) in 4 m | dB(A) |
| 100 | 3,32 | 755 | 65 | 80 |
| 90 | 2,90 | 660 | 64 | 79 |
| 80 | 2,10 | 485 | 60 | 76 |
| 65 | 1,25 | 285 | 55 | 71 |
| 50 | 0,70 | 156 | 48 | 64 |
| 30 | 0,27 | 48 | 34 | 53 |
| 15 | 0,17 | 21 | 23 | 43 |

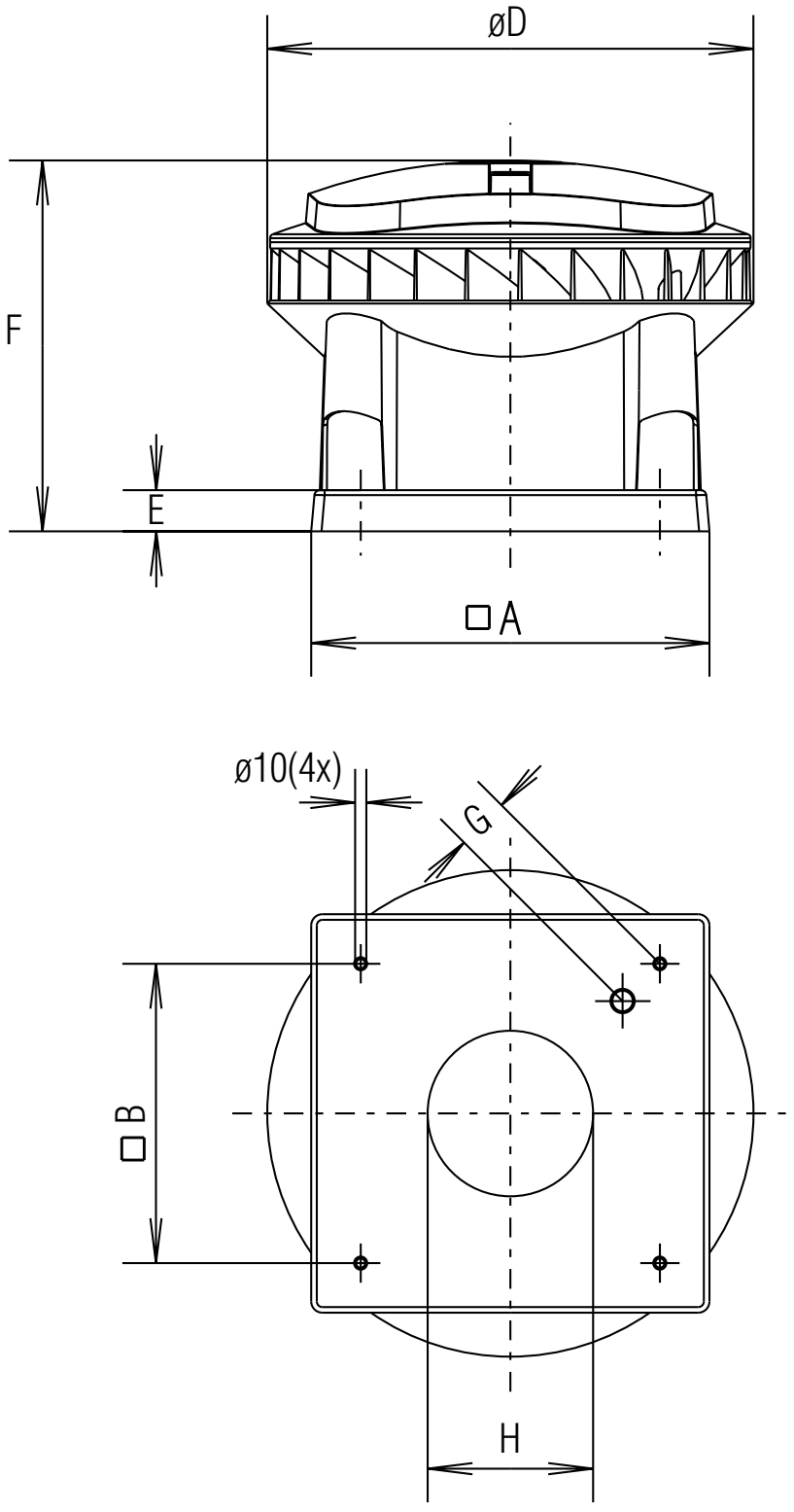
Installation of the DV EC..Pro on a base attenuator reduces the sound power level by approx. 15 dB(A)

**4.3 Exploded view with parts list**




| | |
|---|---|
| Housing | 1 |
| Fan cover | 2 |
| Air cap | 3 |
| Isolation switch | 4 |
| Motor frame | 5 |
| Controls | 6 |
| Motor-Impeller | 7 |
| Sealing rubber | 8 |
| Screw connection | 9 |
| Cable strap | 10 |
| Pull relief | 11 |
| Pressure sensor | 12 |

**4.4 Dimensioned sketches**




Diimensions in mm

| Vent. type | A | B | D | E | F | G | H |
|---|---|---|---|---|---|---|---|
| DV EC 200 Pro | 460 | 330 | 575 | 60 | 473 | 44 | 196 |
| DV EC 250 Pro | 580 | 450 | 708 | 60 | 540 | 48 | 241 |
| DV EC 400 .. Pro | 665 | 535 | 863 | 60 | 601 | 64 | 302 |

# 5. Regulation / 6. Communication

**5.1 Self-regulating mechanical ventilation system**
The DV EC..Pro roof fan has an electronic pressure control. The pressure in the suction line under the fan is automatically regulated to a constant value.
A pressure transmitter has been fitted under the cap of the DV EC..Pro for this purpose and is electrically connected as standard. The hose supplied must be connected to the ventilating system under the fan or silencer, in order to measure the pressure.

It works as follows: The pressure transmitter converts the measured pressure into a 0 – 10V signal for regulation of the DV EC ..Pro. The speed of the DV EC..Pro roof fan and thereby the pressure is regulated on the basis of this 0 – 10V signal.
The required constant pressure is set using the control unit or via a PC/laptop. See Cap. 6.1, 6.2 and 6.3 for details.

**5.2 Manual setpoint input via potentiometer on control unit**
As an alternative to programming via the ZLS BDT or the ZLS IF, the potentiometer can be used on the control unit for setpoint adjustment.

- In the "analog" mode, the power in%
- In the "digital" mode, the pressure in Pa

Further information on this topic can be found in the current Quick Overview "chapter 3, potentiometers on the control unit"

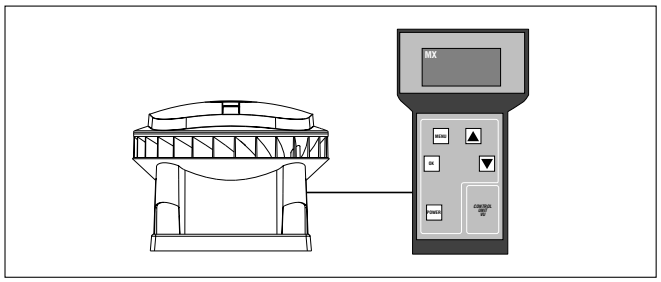
☞ If the potentiometer is not set to "0", the software setting is ignored!

**6. Communication**
**6.1 Reading and adjustment**
Each DV EC..Pro is fitted with a connection for the control unit or a laptop/PC. This connection can be found under the DV EC..Pro cover. Various units can be adjusted and read via this connection, such as:

- type of fan and controls;
- required capacity and limitations of minimum and maximum capacity;
- required pressure for day and night;
- current speed;
- current pressure;
- address and group number (for application of DV EC..Pro in a network);
- malfunctions.

In case of a desired extension of the data line, the data line should not exceed a maximum length of 50 m, otherwise a release of the factory is necessary. The data line (twisted pair) must be shielded (e.g. JY [ST] Y 2 x 2 x 0,8 mm²).

**6.2 Control unit ZLS-BDT** (accessory Ref.No. 8390)
The control unit allows for direct communication with the fan.



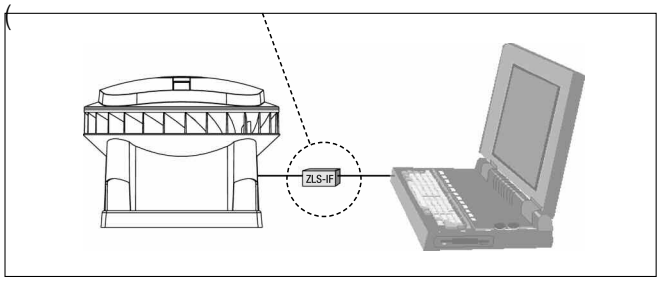
**Method of operation**
The plug of the unit is inserted into DV EC..Pro connection. Once the control unit has been switched on, the current data of the DV EC..Pro is shown on the display of the unit. These settings can be changed. Consider the following applications, for example:

- adjustment on side or subsequent re-adjustment of the capacity of the DV EC..Pro;
- setting the required pressure;
- setting an address (DV EC..Pro in network).

The unit is supplied in a case with a user's manual. Also included with the unit is a charging unit for charging in a car (12 V) or via a wall socket (230 V).

☞ Never store ZLS-BDT with empty batteries. Otherwise, the durability of the battery is extremely reduced!

**6.3 Interface ZLS-IF for Laptop/PC** (accessory Ref.No. 8391)
The Helios Maintenance Software can be used for direct communication between a laptop/PC and the DV EC... Pro.
For connecting the DVEC to a laptop/PC a RS 485/232-converter is used (accessory ZLS-IF, Ref.No. 8391).




The possibilities for adjustment and reading are virtually the same as those for the control unit. The main difference is that, when you use a laptop/PC, the DV EC..Pro settings can be saved as a file.
The time response for pressure and speed can be indicated graphically and be printed out when required. An overview of possibilities is shown in the quick overview: connection / configuration.

**6.4 DV EC... Pro network**
A network of fans can be built, by interconnecting of a number of DVEC fans using the communication connection. The serial connection of each fan is double, in order to interconnect them. Each fan in the network is programmed with its own address, via a laptop/PC or a control unit.
The shielded data line (twisted pair) should not exceed a maximum length of 50 m, otherwise a release of the factory is necessary. The last device in the chain must be provided with a final resistance of 120 W.

Data line(e.g.):
RS A = J Y [ST] Y 2 x 2 x 0,8 mm²
RS B = J Y [ST] Y 2 x 2 x 0,8 mm²

# 7. Installation

**7.1 Installation conditions**

- The DV EC..Pro must be installed according to the general and locally applicable safety and installation regulations.
- The DVEC must be fitted in such a manner that there is no risk of anybody touching the suction side of the fan (see DIN EN ISO 13857).
- The permissible temperature of the air to be moved is from -30 °C und +60 °C.
- The fan is designed for continuous operation and may not be switched on and off more frequently than once every 5 minutes.

**7.2 Transport and storage**

- The DV EC..Pro must be transported and stored horizontally.
- The fan should preferably be lifted using the recesses in the side of the housing or on the base.
- Ensure that the packing materials are disposed of in an environmentally responsible manner.

**7.3 Checking the delivery**

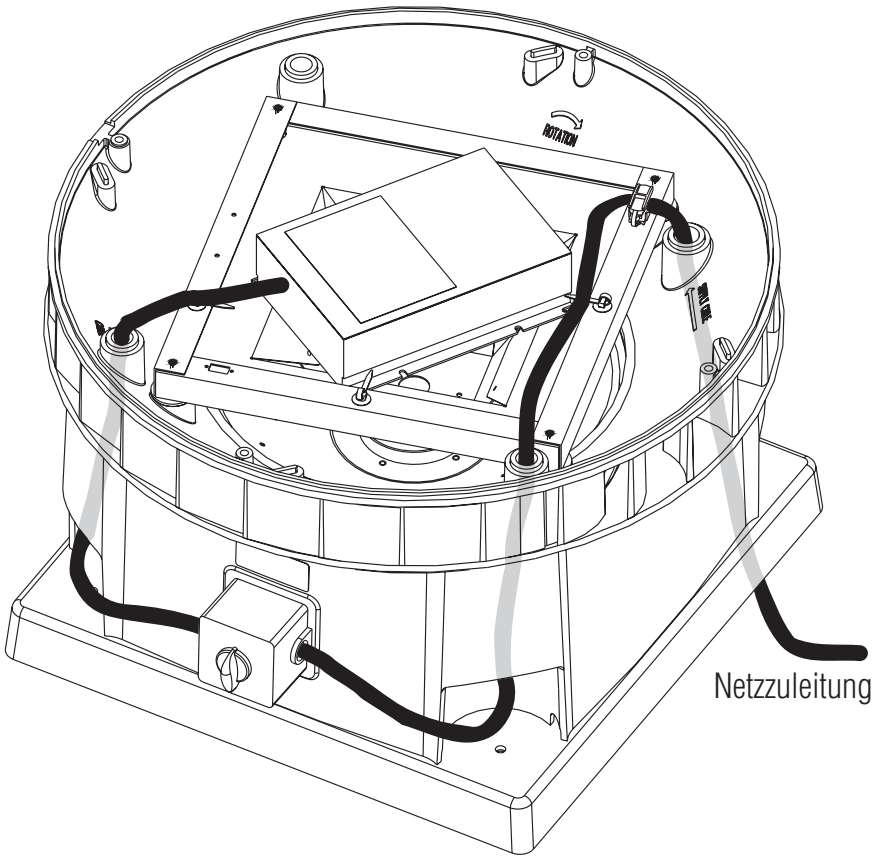
- The type indication and other fan type plate information must match that on the order.
- The box contains the manual, the quick overview and a bag with mounting bolts and rings, intended for attaching the DV EC..Pro to a mounting curb.
- The box contains an installation set; a bag with hose column, clamps and approximately 1,5 m hose.

**7.4 Installation**

**General**

- It is vital that the roof construction or foundation on which the DV EC..Pro is to be installed is sufficiently rigid. If it is not rigid enough, undesirable vibrations may occur during operation of the fan.
- The fan must be installed using the supplied bolts and rings. Ensure that both the foundation and the surface into which the bolts are screwed are sufficiently strong to retain the fan even under severe weather conditions.
- The fan must be mounted horizontally to avoid rain and wind blowing into the fan. The maximum permissible angle of installation is 5° to the horizon.
- The power supply cable, any control cables and possibly a pressure hose can be fed through a tube leading from under the base of the fan to under the fan cover. This tube is indicated under the fan cover as ‘supply cable’, see 7.1. A tube to one of the recesses in the corners in the ventilators can be used to feed cables to the operating switch. This is indicated by ‘cables’, see 7.1.

Fig. 7.1



- A pressure transmitter is fitted under the fan cover and is electrically connected to the controls by means of a 3-wire connection.
- An air hose is pre-fitted standard to the inner hose column on the bottom of the pressure transmitter, which is led through a tube to one of the recesses on the corners of the fan, see 7.2 and/or 7.2.1. This hose is used for measurement of the ambient pressure.
- Fix the supplied hose to the outer hose column on the bottom of the pressure transmitter, see 7.2.1. Lay this air hose via one of the tubes under the cover, to the place in the unit where the pressure must be measured. The pressure is measured under the fan or the silencer.
- The supplied installation set can be used for attachment of the hose. The brackets are provided for attachment of the air dose, the cable gland and the aluminium tube can be used as the pressure measuring point in the mounting curb, see 7.3.
- Ensure the air hose in the pressure measuring point is always fitted outside of the air flow or close along the wall. When not installed exactly upright, not only the static pressure is measured but also a dynamic pressure, so that the regulator cannot react accurately to a constant, static pressure.

☞ **When mounting the DV EC... Pro a shutter must be installed in the extract duct, so that no humidity condenses at standstill in the electronics of the cold fan and consequently damage can be incurred.**
**In this case, no warrenty is given !**

Fig. 7.2

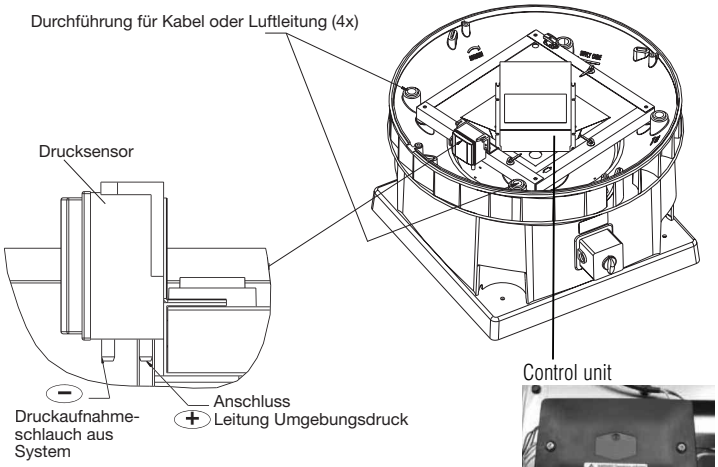
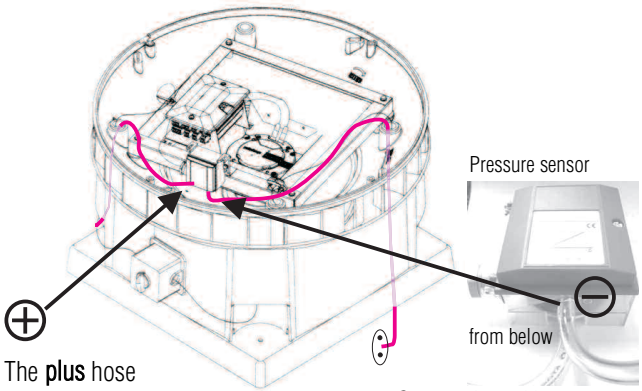


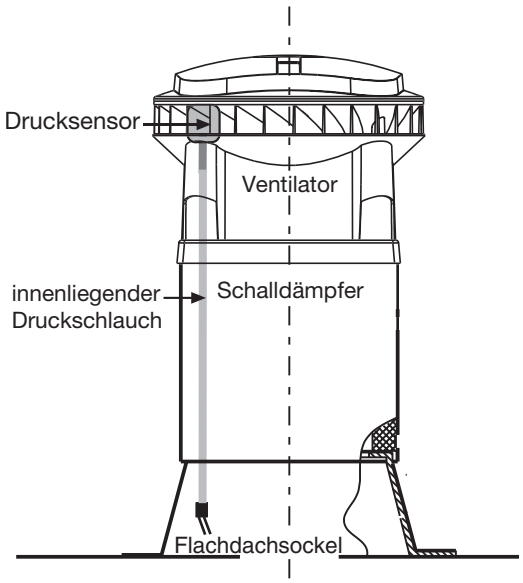

Fig. 7.2.1




The **plus** hose measures the ambient pressure. This is led to the outside.

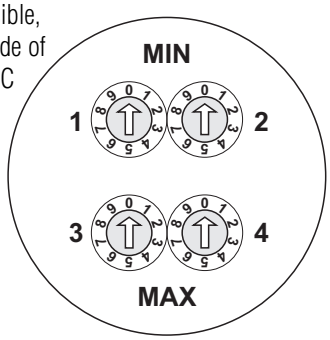
*Connection of hose:*
One end is connected to the **negative** point of the pressure sensor.
The other end, below the fan unit in the ventilation duct. Hereby the negative pressure (equal to the pressure to be controlled) is measured.

Fig. 7.3 **Attention!**
Generally route pressure hose without any kinks or without jamming, otherwise no function.




Take off cover of control unit. The four potentiometers for pressure setpoint setting are freely accessible, see Fig. 7.2.2.Setting and mode of action, see attached ZLS-DVEC Quick Overview (No. 92870).

Fig. 7.2.2

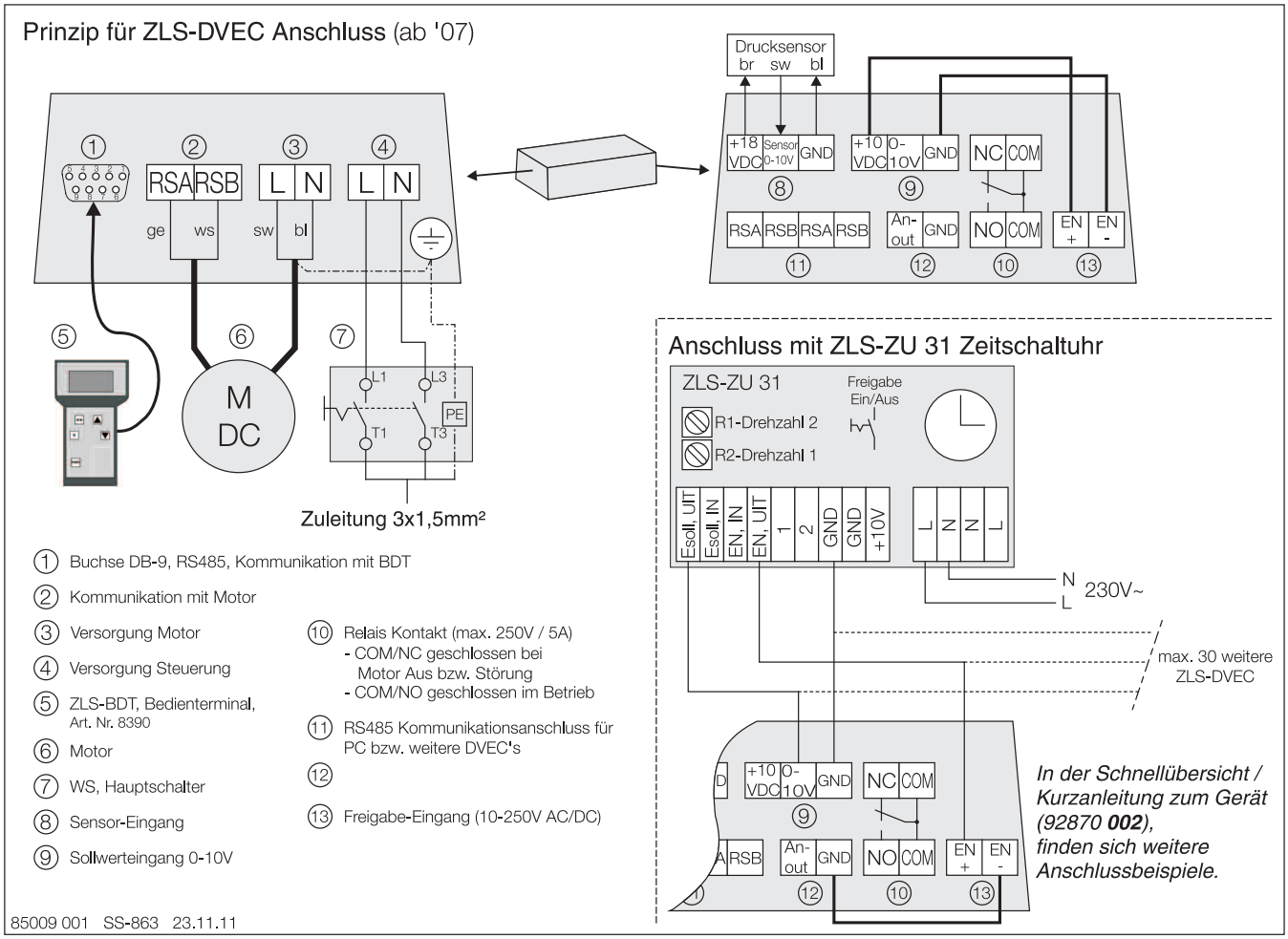


# 8. Electrical connection

**8.1 Terminal board**

The wiring diagram SS-863 for the controls is shown below.

**Note: For the connection and the configuration, as well as the operation of the BDT and/or the software please consult the ZLS-DVEC quick overview (No.92870).**




- Leakage current +/- 10 mA
  With the use of a ground fault circuit interrupter it must be considered that per device a leakage current of +/- 10 mA can occur.

- The input impedance of the senor inputs “E soll” and setpoint input 0-10 VDC is 100 kOhm.

- Sensor connection (3): Connection of pressure sensor

- Release contact (6): the current at this contact must be 10 – 250 volt [AC or DC]. When there is no current at the release contact, the fan will not work, even if there is 230V power supply.

- Malfunction contacts (5): There is a make and break contact. In case of a malfunction, the contact between the two COM/NO clamps is closed and between the two COM/NC clamps is opened. The reverse situation occurs when there is ‘no malfunction’. Load capacity: 250V ~ 5 A / cos φ1.

- Communication port for ZLS-BDT (1) on motor side control unit. The communication port for the ZLS-IF / PC must be connected to the communications side of the control unit (11). The same also applies when connecting several DV EC..Pro fans.

- NOTE: When connecting several DV EC ... Pro units no phase balance must be observed!

### 8.2 Wiring upon delivery

Connection: see ZLS-DVEC quick overview !

### 8.3 Relationship between speed and current at 0-10V controls input

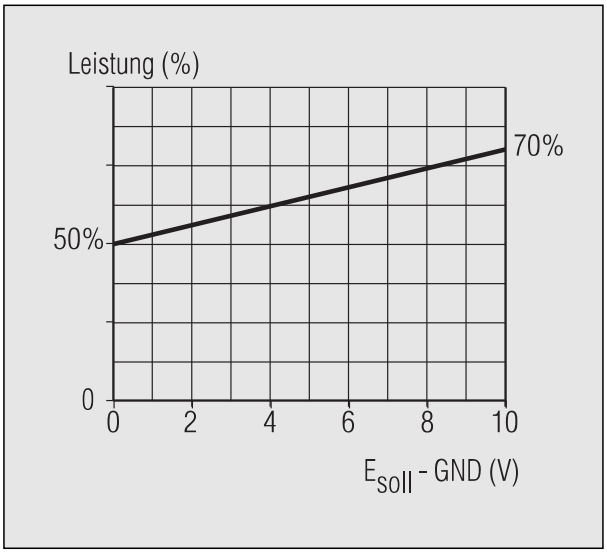
When connecting regulators, the speed of the DV EC..Pro is controlled by varying the voltage at the 0-10V controls output. Measurement of the voltage between the clamps Esoll and GND of the 0-10V controls input allows for the speed of the fan to be derived from one of the graphs given below. The voltage between Esoll and GND can be measured either at the DV EC..Pro (two clamps of the 0-10V controls input) or the switch/clock timer (ZLS-ZU 31).

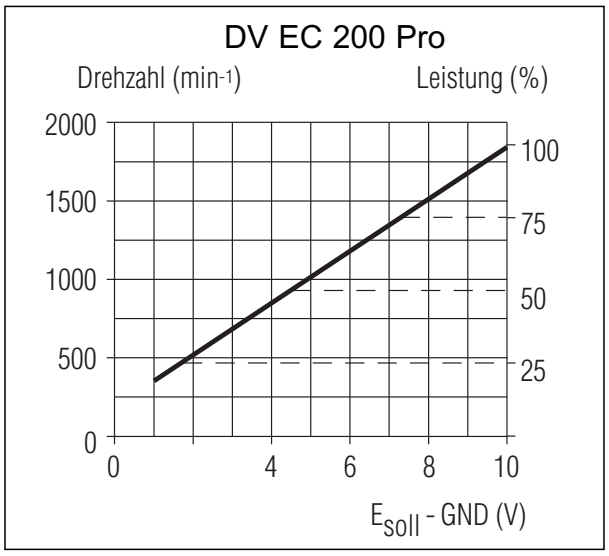
☞ These graphs apply only if the minimum and maximum capacity setting has not been changed.

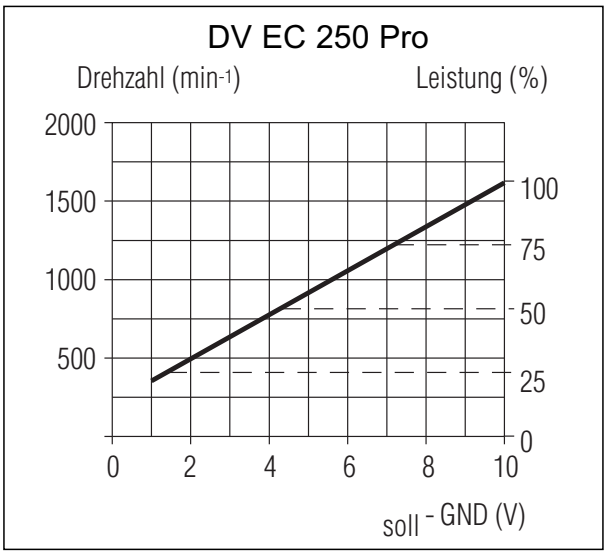
The minimum and maximum capacity can be adjusted using the control unit ZLS-BDT or the laptop/PC. This means that the graphics of the fan change.

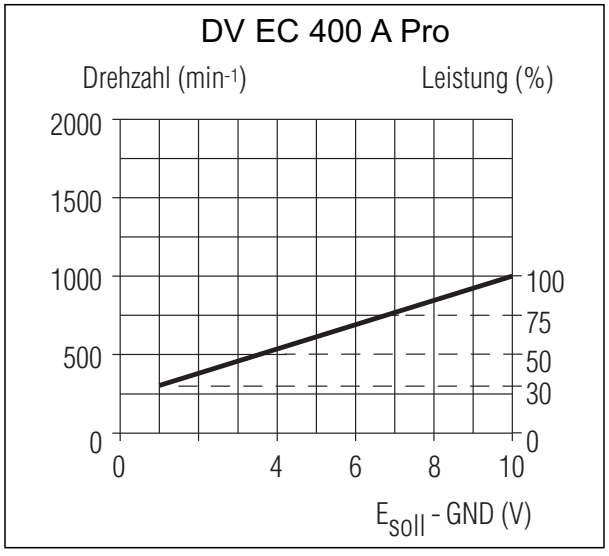
**Example**

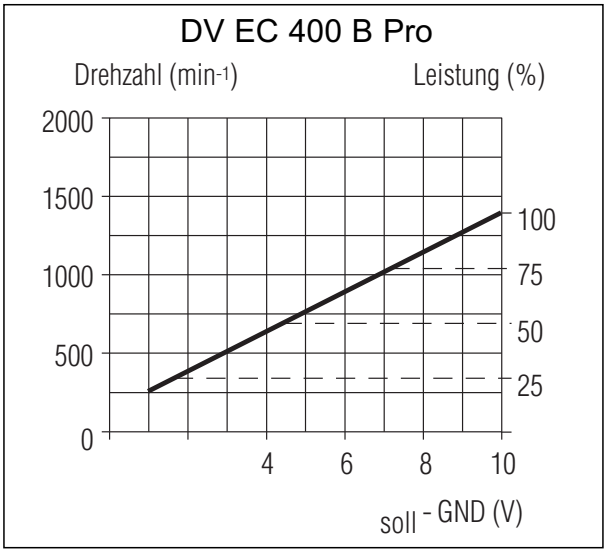
Min. capacity 50% and max. capacity 70% means 50% at 0V and 70% at 10V at the 0-10V controls input.



# 9. Adjustment

**9.1 Summary of DV EC..Pro settings (see ZLS-DVEC Quick Overview No. 92870)**

**9.2 DV EC... Pro network: addressing, settings and copying of settings**

If more than one DV EC..Pro is connected (see wiring diagram in quick overview), each DV EC..Pro must have its own address.

**Addressing**

1. Make a (roof) summary of all fans, divide the fans into groups of at least 31 and note an address number and group number by each fan.
2. Use the operating switch to turn off all fans connected in this network.
3. Connect the control unit (ZLS-BDT, Ref. No. 8390) to the first DV EC..Pro.
4. Turn this fan on only.
5. Enter the correct address in the 'Settings' menu under 'Address'.
6. Enter the correct group number in the 'settings' menu under 'Group'.
7. Possibly also note the address in the table on page 15 of this manual for this fan.
8. Select 'Write/reset' under 'Write/reset in the 'Settings' menu.
9. Now turn this fan off again.
10. Connect the control unit to the next DV EC..Pro.
11. Repeat points 4 to 10 for each DV EC..Pro on this network.
12. Turn all the fans back on.

**Settings**

13. Connect the control unit (ZLS-BDT, Ref. No. 8390) to a random DV EC..Pro.
14. Press the 'Menu' key ('Main menu' will appear).
15. Choose the correct group under 'DV EC..Pro Group no.' in the 'Main menu'.
16. Choose the correct address under 'DV EC..Pro network' in the 'Main menu'.
17. Set the DV EC..Pro in the 'Settings' menu, according to the table in the quick overview.
18. Note the new settings in the table on page 15 of the manual of this fan.

**More than one DV EC..Pro of the same type and with the same setting**

19. Select 'Save/set' then 'Save' in the 'Settings' menu.
20. Possibly choose the next group under 'DV EC..Pro Group no.' in the 'Main menu'.
21. Choose the next address under 'DV EC..Pro network' in the 'Main menu'.
22. Select 'Save/set' then 'Set' in the 'Settings' menu.
23. Select 'Write/reset' under 'Write/reset' in the 'settings' menu.

WARNING ⚠

**Control of several EC fans with a potentiometer**

To control several EC fans via setpoint input "0-10V", the 10VDC power source must provide the sum of all setpoint inputs-burden voltages.

**⚠ The switching in parallel of the +10VDC supplies of serveral EC-fans is not permitted !**

Depending on the type, several EC fans can be controlled with the 10VDC supply from one fan with one potentiometer (PU / A).To this, refer the technical data of the control inputs and the wiring diagram SS-1035 for help.
Should the current of a EC supply be insufficient, a sufficient external 10 VDC can be used (to be provided on site; galvanically isolated from the mains).
Alternatively the module „EUR EC" from Helios can be used for varied control duties.

### 9.4 Control of air volume

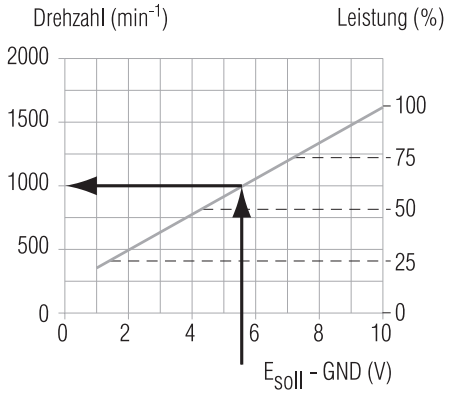
The air volume is determined by the speed of the impeller und the negative pressure in the mounting curb, see diagram page 4.

The speed can be determined by:
- measuring with aid of a stroboscope;
- reading the speed with the Control Unit in the 'Status' menu under 'Speed' or PC.

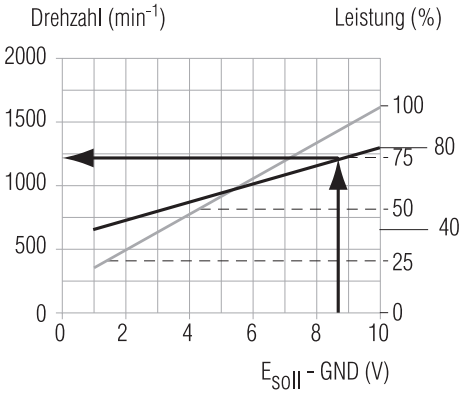
The underpressure can be determined by:
- measuring he underpressure in the mounting curb;
- reading the underpressure with the control unit in the 'Status' menu unter 'Sensor';

The air volume can now be determined.
- Now draw the speed line found in the diagram on page 4.
- Now draw a line from the negative pressure found to the right.
- Draw a line vertically from the intersection point found and determine the air volume.

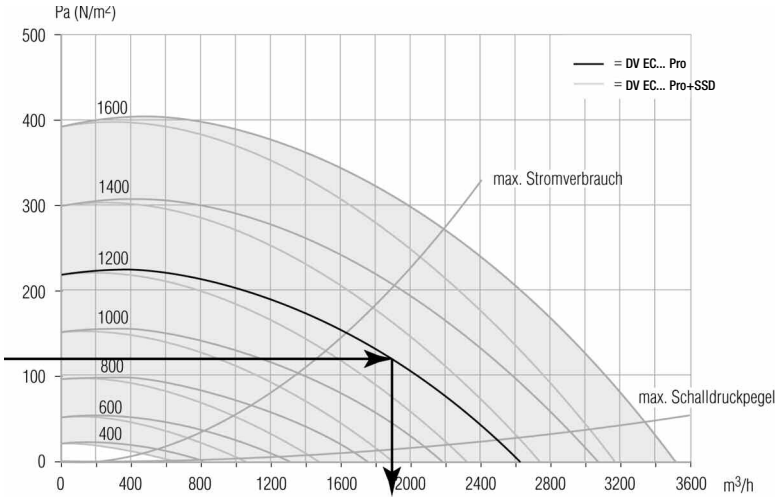
**Example**
**DV EC 250 Pro**




Measured voltage 5,5V
Speed 1000 min. -1




Minimum capacity setting 40%
Maximum capacity setting 80%
Measured voltage 8,7 V
Speed 1200 min. -1




**Example**
Speed 1200 min-1
No silencer
Underpressure 120 Pa
Air volume is 1900 m³/h.

**Conclusions**
More air than the design value means that the resistance in the system is lower than the design value..
Possible causes are:
- lower duct resistance than assumed;
- valves or grilles have not be fitted or adjusted (open too far);
- leakage in the duct system. Compare the air volume with the total measured air volume through the valves.

Less air than the design value means that the resistance in the system is higher than the design value:
Possible causes are:
- higher duct resistance than assumed;
- valves and grilles not adjusted (too far closed);
- blockage in the duct system. Compare the air volume with the total measured air volume through the valves.

**9.5 Test report**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Fan type: | | | | | | | | |
| Group/Address/Setpoint | | | / | | | / | | |
| Pressure set at… Pa | | | | | | | | |
| Scheme: | | | | | | | | |
| Room: | | | Kitchen | Kitchen | Bathroom | Toilet | ….. | ….. |
| Valve type or Type of Extraction hood: | | | | | | | | |
| Required air delivery high: in 1/sec. or m³/h.* | | | | | | | | |
| ETAGE | | A | | | | | | |
| | | Q | | | | | | |
| | | A | | | | | | |
| | | Q | | | | | | |
| | | A | | | | | | |
| | | Q | | | | | | |
| | | A | | | | | | |
| | | Q | | | | | | |
| | | A | | | | | | |
| | | Q | | | | | | |
| | | A | | | | | | |
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| | | A | | | | | | |
| | | Q | | | | | | |
| | | A | | | | | | |
| | | Q | | | | | | |
| | | A | | | | | | |
| | | Q | | | | | | |
| | | A | | | | | | |
| | | Q | | | | | | |

A = Adjustment of valve or extraction hood Q = Air volume in 1/sec. or m³/h*
* Delete as appropriate.

# 10. Inspection and maintenance

**10.1 Inspection and maintenance**

The fan should be inspected once every two years. This depends on the degree of pollution of the air. More frequent inspection is required in case of extreme pollution. Examples could include in international kitchens or industrial processes.

- Make sure that parts of the ventilator not yet anchored and tools cannot fall/blow off the roof or cause damage or personal injury in any matter.
- When the ventilator is completely or partly dismantled, make sure nobody can touch rotating parts or parts under current.
- Do not leave a (partly) dismantled fan which is connected to the power supply, unattended.
- Make sure that parts which conduct current do not become wet.

**Proceed as follows for inspection or maintenance:**

1. Turn off the fan using the isolator switch (4).
2. Remove the fan cover (2).
3. Unscrew the a bolts (9).
4. Lift the inner fan components (5) (motor-impeller, frame and housing) vertically and then lay them upside down in the housing

☞ Take care not to damage the cables and air hoses..

5. If necessary, clean the impeller (7) carefully using a soft brush.

☞ Do not damage or bend the impeller.

6. If necessary, clean the housing (1) using a soft brush.
7. Insert the inner components (5) back in place.
8. Check that impeller (7) can rotate freely.
9. If necessary, clean the controls (6) carefully using a soft brush.
10. Check that the cables and hoses are not lying against sharp edges of the frame or the controls.
11. Make sure the cables cannot come in contact with the impeller (7)
12. Clean the air cap (3) in the fan cover.
13. Fix the fan cover back in place (2).
14. Turn the fan back on using isolation switch (4) and check whether it works properly.
15. Also check whether the fan reacts properly to the regulator.
16. Check pneumatic negative pressure.
    – Connection to the Ventilation System

**For the connection and the configuration, as well as the operation of the BDT and/or the software, please consult the ZLS-DVEC (No. 92870).**

# 11. Malfunctions

### 11.1 Malfunction tables

Two malfunction tables have been included below. *Table1* is for identification of a malfunction in an DV EC..Pro. Here it is referred twice to the previous page. Besides, it concerns the check of the pressure transmitter. *Table 2* is intended for identification of a malfunction in an DV EC..Pro installation with regulator(s). Use this table to check the complete regulator circuit. Check the entire installation according to the table. Follow the instructions from the top down. Only follow those instructions which are marked in the appropriate column. Proceed as follows:

- Make sure there is 18 V (= from the controls or external) on clamp '18 V' and 'GND'.
- Measure the regulating signal at the 'Sensor 0-10 V' and 'GND' clamps. Signal can be checked, where you gently blow into the outer pressure hose (voltage increases).
- Compare the measured pressure through the pressure sensor (the 'Sensor' value in the 'Status' menu) with the pressure measured through a 'foreign' pressure meter. Use the same pressure hoses on the two meters.

**Table 1:**

| Complaint | LED on controls | Possible for | What do I measure | Display in menu „Malfunctions“ | Particulars in „Status“ menu | Cause | Action |
|---|---|---|---|---|---|---|---|
| **Does not rotate** | Red | All | Nothing in particular | Impeller blocked | Nothing in particular | Impeller blocked | Check free-running of impeller |
| **Does not rotate** | Red | All | No 230 V~ between 'L' and motor 'N' | No communication with motor | - | Wiring to motor or controls defective | Check wiring or replace controls |
| **Does not rotate** | Red | All | 230 V~ between 'L' and motor 'N' | No communication with motor | - | Wiring to motor or controls defective | Check wiring or replace controls |
| **Does not rotate** | Red | All | No 2,5 V between motor RSA and motor RSB | No communication with motor | - | Wiring to motor or controls defective | Check wiring or replace controls |
| **Does not rotate** | Red | All | 2,5 V between motor RSA and motor RSB | No communication with motor | - | Wiring to motor or controls defective | Check wiring or replace controls |
| **Does not rotate** | Red | All | No 10 V= or more at release contact | None | Speed: 0 rev/min. | Break in the release circuit | Check release circuit, also between DV EC... Pro and regulators, see second table. |
| **Does not rotate** | Red | All | - | Hall senor | - | Motor defective | Replace motor-impeller |
| **Does not rotate** | Out | All | No 230 V~ between 'L' and 'N' | No connection | - | No supply voltage | Check operating switch connection and the electrical installation |
| **Does not rotate** | Out | All | 230 V~ between 'L' and 'N' | No connection | - | Controls defective | Replace controls |
| **Does not rotate** | Red | All | - | Internal communication error | - | - | Replace controls |
| **Does not rotate** | Red | All | - | Temperature controls | - | - | Check free-running of impeller |
| **Rotates (too slowly)** | Red | All | - | Motor temperature | Speed is lower than required | Motor runs with difficulty | Check free-running of impeller |
| **Rotates (too slowly) and makes too much noise** | Red | All | - | Motor temperature | Speed is lower than required | Impeller sticks | Check free-running of impeller |
| **Rotates constantly at high speed** | Green | External regulators | 10 V = between 0-10 V and GND, regulator is in regulating position | None | Nothing in particular | Impeller blocked | Replace controls |
| **Rotates constantly at low speed** | Green | External regulators | If '10 V' and '0-10 Vl' clamps are connected, ventilator does not speed up. Disconnect the '0-10 V wire. | None | According to „ settings“ low | Controls defective | Replace controls |
| **Rotates constantly at low speed** | Green | External regulators | If '10 V' and '0-10 V' clamps are connected, ventilator speeds up. Disconnect the '0-10 V' wire. | None | According to „ settings“ low | (Wiring to) regulator is broken | Check (wiring to) regulator, if necessary replace them (see second table) |
| **Rotates constantly at maximum speed** | Green | ZMV | 0 V = between '18 V' and GND clamp of the controls | None | Sensor: 1 Pa | Controls defective | Replace controls |

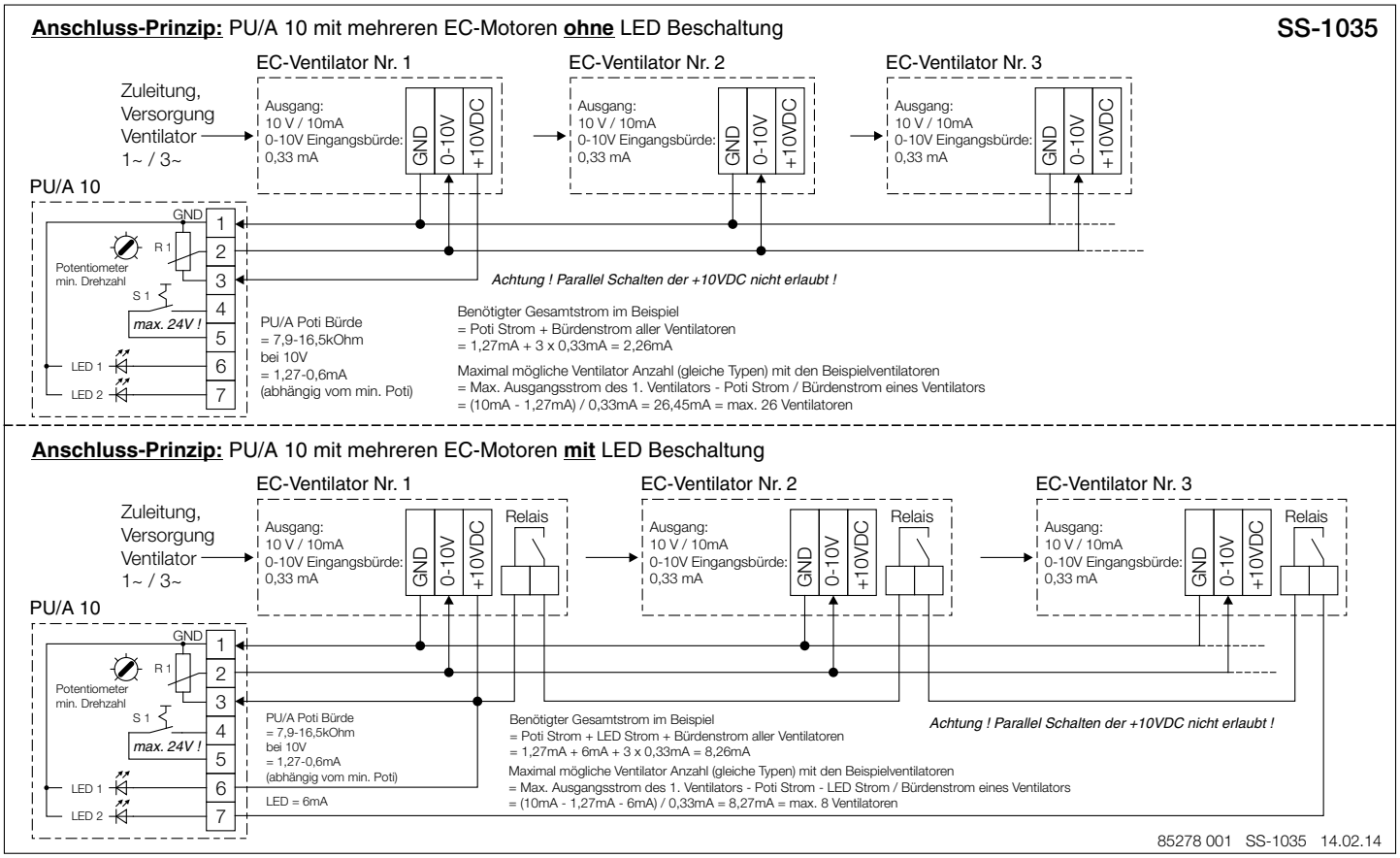
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Rotates constantly at maximum speed** | Green | ZMV | 18 V= between '18 V' and 'GND' clamp<br>0V = between '0-10 V' and GND clamp of the controls | None | Sensor: 1 Pa | (Wiring to) pressure transmitter is defective | Check (wiring to) pressure transmitter, if necessary replace them. See previous page |
| **Rotates constantly at maximum speed** | Green | ZMV | 18 V= between '18 V' and 'GND' clamp<br>0V = betweene '0-10 V' and GND clamp of the controls | None | Sensor: 1 Pa | Pressure difference is measured | Check pressure measure point/hose blocked or lose |
| **Rotates constantly at minimum speed** | Green | ZMV | No 18 V = between '18 V' and GND clamp of the controls | None | Sensor: +/- 300 Pa | Controls defective | Replace controls |
| **Rotates constantly at minimum speed** | Green | ZMV | 18 V = between '18 V' and GND clamp of the controls | None | Sensor: +/- 300 Pa | (Wiring to) pressure transmitter is defective | Check (wiring to) pressure transmitter, if necessary replace them. See previous page |
| **Ventilator vibrates** | Green | All | Nothing in particular | None | Nothing in particular | Impeller out of balance | Check impeller for pollution or replace the motor-impeller |
| **Ventilator makes excessive noise** | Green | All | Nothing in particular | None | Nothing in particular | Bearing defective | Replace motor-impeller |
| **Ventilator makes excessive noise** | Green | All | Nothing in particular | None | Nothing in particular | Impeller sticks | Check whether anything is caught in the rotor, or the impeller is running against the base or the cabling to the motor |
| **ZLS-BDT settings are not applied** | Red/Green | All | Nothing in particular | - | - | Controls defective | Replace controls |
| **ZLS-BDT and ZLS-IF settings are not memorized** | Green | All | Nothing in particular | - | - | Potentiometer on control unit not on zero position | Turn poteniometer to zero position |

Or: using control unit ZLS-BDT in the 'Settings' menu, then 'Write/reset'.
**Attention:** The settings of the 'Settings' menu are passed on to the fan.

### Table 2:

| Carry out check of: | Check to be carried out, if yes then go to next line. | If yes. then go to next line | ZLS-ZU 31 |
|---|---|---|---|
| **ZLS-ZU 31** | 230 V~ on the 'L' and the 'N' clamp ? | Electrical installation | x |
| **ZLS-ZU 31** | 10 V = on the '+10 V' and the 'GND' clamp ? | Check the F3 fuse. | x |
| **ZLS-ZU 31** | 10 V = on the clamps 'EN AUS' and 'GND' switch on.<br>0 V = on the clamps 'EN AUS' and 'GND' switch off. | ZLS-ZU 31 | x |
| **ZLS-ZU 31** | Adjust potentiometer R1. Does the voltage vary between clamp '1' and 'GND'? (Reset the potentiometer to the same voltage.) | ZLS-ZU 31 | x |
| **ZLS-ZU 31** | Adjust Potentiometer R2. Does the voltage vary between clamp '21' and 'GND'? (Reset the potentiometer to the same voltage.) | ZLS-ZU 31 | x |
| **ZLS-ZU 31** | Switch the timer manually. Does the voltage vary between clamp '0-10 V' 1 and 'GND'? DNG | ZLS-ZU 31 timer. See also timer manual for the timer control. | x |
| **ZLS-ZU 31** | Switch the timer manually. Does the voltage vary between clamp '0-10 V AUS' and 'GND'? | ZLS-ZU 31 check the F2 fuse. | x |
| **DV EC... Pro** | Remove the wire on the '$E_{soll}$' clamp. Does the DV EC...Pro start working in low speed | DV EC... Pro controls | x |
| **DV EC... Pro** | Connect up the '10 V' and '0-10 V' clamp. Disconnect the '0-10 V' wire. Does the DV EC... Pro start working in high speed? | DV EC... Pro controls | x |
| **DV EC... Pro** | Remove the wire on the 'EN' clamp. Does the impeller stop? | DV EC... Pro controls | x |
| **DV EC... Pro** | Return the wiring to it's original state. | | |
| **DV EC... Pro** | Remove the wire on the'$E_{soll}$' clamp. Does the DV EC... Pro start working in low speed? | DV EC... Pro controls | x |
| **DV EC... Pro** | Connect up the '10 V' and '0-10 V' clamp. Disconnect the '0-10 V' wire. Does the DV EC... Pro start working in high speed? | DV EC... Pro controls | x |
| **DV EC... Pro** | Remove the wire on the 'EN' clamp. Does the impeller stop? | DV EC... Pro controls | x |
| **DV EC... Pro** | Return the wiring to it's original state.<br>Does the controls work well? | DV EC... Pro controls - VG 31 or ZLS-ZU 31 | x |

### Connection principle


Anschluss-Prinzip: PU/A 10 mit mehreren EC-Motoren ohne LED Beschaltung
SS-1035
EC-Ventilator Nr. 1
EC-Ventilator Nr. 2
EC-Ventilator Nr. 3
Zuleitung, Versorgung Ventilator 1~ / 3~
Ausgang: 10 V / 10mA 0-10V Eingangsbürde: 0,33 mA
GND
0-10V
+10VDC
PU/A 10
Potentiometer min. Drehzahl
R 1
S 1
max. 24V !
LED 1
LED 2
Achtung ! Parallel Schalten der +10VDC nicht erlaubt !
PU/A Poti Bürde = 7,9-16,5kOhm bei 10V = 1,27-0,6mA (abhängig vom min. Poti)
Benötigter Gesamtstrom im Beispiel = Poti Strom + Bürdenstrom aller Ventilatoren = 1,27mA + 3 x 0,33mA = 2,26mA
Maximal mögliche Ventilator Anzahl (gleiche Typen) mit den Beispielventilatoren = Max. Ausgangsstrom des 1. Ventilators - Poti Strom / Bürdenstrom eines Ventilators = (10mA - 1,27mA) / 0,33mA = 26,45mA = max. 26 Ventilatoren
Anschluss-Prinzip: PU/A 10 mit mehreren EC-Motoren mit LED Beschaltung
Relais
Achtung ! Parallel Schalten der +10VDC nicht erlaubt !
LED = 6mA
Benötigter Gesamtstrom im Beispiel = Poti Strom + LED Strom + Bürdenstrom aller Ventilatoren = 1,27mA + 6mA + 3 x 0,33mA = 8,26mA
Maximal mögliche Ventilator Anzahl (gleiche Typen) mit den Beispielventilatoren = Max. Ausgangsstrom des 1. Ventilators - Poti Strom - LED Strom / Bürdenstrom eines Ventilators = (10mA - 1,27mA - 6mA) / 0,33mA = 8,27mA = max. 8 Ventilatoren
85278 001 SS-1035 14.02.14

### Technical data of control inputs

| Type | Potentiometer supply in V / mA | Control / Setpoint input in V / A (load) | Number of potential fans with a potentiometer from a 10V supply (without PU/A LED) | Number of potential fans with a potentiometer from a 10V supply (with PU/A LED) | Number of potential fans with EUR EC |
|---|---|---|---|---|---|
| **DV EC 200 Pro** | 10V / 20mA | 0-10V / 0,1mA (Ri=100kOhm) | **187** | 127 | 100 |
| **DV EC 250 Pro** | 10V / 20mA | 0-10V / 0,1mA (Ri=100kOhm) | **187** | 127 | 100 |
| **DV EC 400 A Pro** | 10V / 20mA | 0-10V / 0,1mA (Ri=100kOhm) | **187** | 127 | 100 |
| **DV EC 400 B Pro** | 10V / 20mA | 0-10V / 0,1mA (Ri=100kOhm) | **187** | 127 | 100 |

Note:

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**Service und Information**

**D** HELIOS Ventilatoren GmbH + Co KG · Lupfenstraße 8 · 78056 VS-Schwenningen
**CH** HELIOS Ventilatoren AG · Steinackerstraße 36 · 8902 Urdorf
**A** HELIOS Ventilatoren · Postfach 854 · Siemensstraße 15 · 6023 Innsbruck
**F** HELIOS Ventilateurs · Le Carré des Aviateurs · 157 av. Charles Floquet · 931555 Le Blanc Mesnil Cedex
**GB** HELIOS Ventilation Systems Ltd. · 5 Crown Gate · Wyncolls Road · Severalls Industrial Park · Colchester · Essex · CO4 9HZ